UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/926,016	01/24/2002	Ian J. Murgatroyd	105.001	2419

28062 7590 06/20/2003

BUCKLEY, MASCHOFF, TALWALKAR, & ALLISON
5 ELM STREET
NEW CANAAN, CT 06840

EXAMINER	
COHEN, AMY R	
ART UNIT	**PAPER NUMBER**
2859	

DATE MAILED: 06/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Offic Action Summary	Application No. 09/926,016	Applicant(s) MURGATROYD ET AL.	
	Examiner Amy R Cohen	Art Unit 2859	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disp sition of Claims

4)☒ Claim(s) *1-87* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-87* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 January 2002* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 42a-42d, 44, and 44a-44d. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 47, 49, and 166. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

4. The disclosure is objected to because of the following informalities:

Page 24, line 30 “photodetectors 114,128” should be --photodetectors 114, 120--.

Page 25, line 6 “grating 15” should be --grating 18--.

Appropriate correction is required.

Claim Objections

5. Claims 3, 9, 10, 12, 21, 83, 84 are objected to because of the following informalities:

In all claims where present, "analyser" should be spelled --analyzer-- and "tuneable" should be spelled --tunable--.

Claim 3, line 2 "second section" lacks proper antecedent basis in the claims.

Claim 9, "the full width half maximum spectral bandwidth" lacks proper antecedent basis in the claims.

Claim 10, line 2 "the side-lobe suppression ratio" lacks proper antecedent basis in the claims.

Claim 12, line 2 "the optical channels" lacks proper antecedent basis in the claims.

Claim 21, line 1 "the numerical factor" lacks proper antecedent basis in the claims.

Claim 83, line 1 "the ends" lacks proper antecedent basis in the claims.

Claim 84, "the ends" and "the said unconnected legs" lack antecedent basis in the claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 3, 4, 11, 12, 41-45, 47, and 85 are rejected under 35 U.S.C. 102(b) as being anticipated by Morey et al. (U. S. Patent No. 5,469,520).

Morey et al. teaches an optical spectrum analyzer (38) comprising: a length of an optical fibre (24) for receiving an input optical signal (22); a tuneable optical filter (26) in optical communication with the input fibre, the tuneable optical filter including a first in-fibre Bragg grating inscribed in a first section of fibre (Col 2, lines 59-67), and means operable to apply a variable axial force to the first section of the fibre (90), to thereby tune the peak wavelength of the grating over a desired wavelength range (Col 3, lines 27-55); and optical detection means operable to detect an optical signal selected by the tuneable optical filter (Col 3, lines 11-55).

Morey et al. teaches the optical spectrum analyzer in which the said means is operable to apply a variable axial force to one or each of the first and second sections of the fibre (Col 3, lines 27-47).

Morey et al. teaches the optical spectrum analyzer in which the optical spectrum analyzer is for use with a multi-channel optical system, the channels being substantially equally spaced in wavelength space (Col 1, line 17-Col 2, line 9).

Morey et al. teaches the optical spectrum analyzer in which the axial force is strain (Col 3, lines 56-67).

Morey et al. teaches the optical spectrum analyzer in which the peak wavelength of each grating, when unstrained, is less than the wavelengths of the optical channels

present within the respective wavelength tuning ranges of the gratings (Col 2, lines 10-36).

Morey et al. teaches the optical spectrum analyzer in which the difference in the peak wavelengths of the grating is equal to the wavelength spacing of the optical channels multiplied by a numerical factor (Fig. 2 and Col4, lines 10-44).

Morey et al. teaches the optical spectrum analyzer in which the means operable to apply a variable strain comprises a spaced pair of mandrels, the part of the grating length of fibre including the section or sections of fibre including one or more gratings being mountable therebetween (Col 4, lines 10-44).

Morey et al. teaches the optical spectrum analyzer in which the mandrels are shaped to avoid sharply bending an optical fibre wound therearound, and are substantially cylindrical in shape (Col 4, lines 10-44).

Morey et al. teaches the optical spectrum analyzer in which the mandrels are fabricated from a material which minimizes the forces acting between the mandrel and the fibre coating without abrading or chemically altering the fibre coating, such as self-lubricating material, such as graphite (Col 4, lines 27-62).

Morey et al. teaches the optical spectrum analyzer in which a continuous groove is provided around the outer surface of each mandrel, for receiving the parts of the grating length of the fibre on either side of the section or sections of fibre including one or more gratings, the groove extending for a plurality of turns around the mandrel, to enable the said lengths of fibre to complete a sufficient number of turns around the mandrel to be held in place on the mandrel by means of frictional forces (Col 4, lines 10-62).

Morey et al. teaches the optical spectrum analyzer in which the mandrels are movably mounted on a mounting member, one mandrel being roatatbly mounted on the mounting member on a motor means (98) operable to rotate said mandrel (Col 3, lines 27-55).

Morey et al. teaches the optical spectrum analyzer in which means operable to apply a variable strain is athermalized (Col 1, line 59-Col 2, line 36).

Morey et al. teaches the optical spectrum analyzer in which the axial force is compression (Col 2, lines 10-18).

8. Claims 1, 2, 5, 6, 17, 18 22, 39, 86, 87 are rejected under 35 U.S.C. 102(b) as being anticipated by Kersey et al. (U. S. Patent No. 5,748,312).

Kersey et al. teaches an optical spectrum analyzer (Fig. 4) comprising: a length of optical fibre (22) for receiving an input optical signal (32); a tuneable optical filter (38) in optical communication with the input fibre, the tuneable optical filter including a first in-fibre Bragg grating (FBG) inscribed in a first section of fibre, and means operable to apply a variable axial force to the first section of fibre (Col 2, line 66-Col 3, line 8), to thereby tune the peak wavelength of the grating over a desired wavelength range; and optical detection means (50) operable to detect an optical signal selected by the tuneable optical filter.

Kersey et al. teaches the optical spectrum analyzer in which the tuneable optical filter includes first and second in-fibre Bragg gratings inscribed in first and second sections of fibre respectively, the spectra of the gratings having different peak wavelengths (Col 7, lines 1-19).

Kersey et al. teaches the optical spectrum analyzer in which the peak wavelengths of the gratings are tuneable over different wavelength ranges, the ranges being of substantially the same spectral width (Col 7, lines 20-61).

Kersey et al. teaches the optical spectrum analyzer in which the wavelength tuning ranges substantially abut or overlap in wavelength space (Col 7, lines 20-61).

Kersey et al. teaches the optical spectrum analyzer in which the first and second sections of the fibre are located within a grating length of optical fibre, the grating length of fibre being long compared to the lengths of said sections (Col 9, lines 31-58).

Kersey et al. teaches the optical spectrum analyzer on which first and second sections of fibre, and hence the gratings, are spacially separate within the grating length of fibre (Col 9, lines 31-58).

Kersey et al. teaches the optical spectrum analyzer wherein said means operable to apply a variable axial force applies a strain and wherein the grating length of optical fibre is mounted on the means operable to apply a variable strain, to thereby enable a variable strain to be applied to the first and second sections of fibre, and hence to both gratings, at the same time (Col 9, lines 31-58).

Kersey et al. teaches the optical spectrum analyzer in which the tuneable optical filter includes more than two in-fibre Bragg gratings, each grating being inscribed in a respective section of fibre (Col 9, lines 31-58).

Kersey et al. teaches the optical spectrum analyzer in which the optical signal selected by the tuneable optical filter is transmitted by one grating (Col 9, lines 31-64).

Kersey et al. teaches a tuneable optical filter comprising: first and second in-fibre Bragg gratings inscribed in first and second sections of optical fibre respectively, the

spectra of the gratings having different peak wavelengths, and means operable to apply a variable axial force to one or each of the first and second sections of fibre, to thereby tune the peak wavelength of the or each grating over a desired wavelength range, wherein the wavelength tuning range of the first grating is adjacent in wavelength space to the wavelength tuning range of the second grating, such that the combined tuning range of the gratings is greater than the tuning range of one grating (Col 2, line 30-Col 3, line 57).

9. Claims 1, 2, 9, 13-17, 19, 21, 23, 24, 34-38, 49-56 are rejected under 35 U.S.C. 102(e) as being anticipated by Ellerbrock et al. (U. S. patent No. 6,204,920).

Ellerbrock et al. teaches an optical spectrum analyzer (200) comprising: a length of optical fibre (208) for receiving an input optical signal (204); a tuneable optical filter (204) in optical communication with the input fibre, the tuneable optical filter including a first in-fibre Bragg grating (202) inscribed in a first section of fibre, and means operable to apply a variable axial force to the first section of fibre (Col 8, lines 12-23), to thereby tune the peak wavelength of the grating over a desired wavelength range (Col 7, lines 4-20); and optical detection means (334, 336) operable to detect an optical signal selected by the tuneable optical filter.

Ellerbrock et al. teaches the optical spectrum analyzer in which the tuneable optical filter includes first and second in-fibre Bragg gratings inscribed in first and second sections of fibre respectively, the spectra of the gratings having different peak wavelengths (Col 7, lines 4-20).

Ellerbrock et al. teaches the optical spectrum analyzer in which the full width half maximum spectral bandwidth of the or each grating in between 0.05 nm and 0.5 nm (Col 6, lines 1-18).

Ellerbrock et al. teaches the optical spectrum analyzer in which an optical signal selected by the tuneable optical filter is reflected by only one grating (Col 7, lines 15-35).

Ellerbrock et al. teaches the optical spectrum analyzer in which the optical spectrum analyzer further comprises an optical fibre routing means (210).

Ellerbrock et al. teaches the optical spectrum analyzer in which the optical fibre signal routing means comprises a first optical fibre coupler, one leg on one side of the coupler being communicatively connected to the input fibre and one leg on the other side of the coupler being communicatively connected to the tuneable optical filter (Figs. 2 and 3).

Ellerbrock et al. teaches the optical spectrum analyzer in which an optical isolator is provided between the input fibre and the one leg on one side of the coupler (Figs. 2 and 3).

Ellerbrock et al. teaches the optical spectrum analyzer in which the first and second sections of fibre are located within a grating length of the optical fibre, the grating length of fibre being long compared to the lengths of said sections (Col 3, lines 6-65).

Ellerbrock et al. teaches the optical spectrum analyzer on which the first and second sections of fibre are the same section of fibre, the gratings being inscribed in the same section of fibre and thus being superimposed one upon the other (Col 4, lines 45-52).

Ellerbrock et al. teaches the optical spectrum analyzer in which the numerical factor is equal to an integer plus a fraction of one (Col 7, lines 4-44).

Ellerbrock et al. teaches the optical spectrum analyzer in which the optical detection means is communicatively connected to the second leg on the one side of the first coupler (Figs. 2 and 3).

Ellerbrock et al. teaches the optical spectrum analyzer in which the optical detection means comprises a first photodetector (Col 8, lines 23-34).

Ellerbrock et al. teaches the optical spectrum analyzer in which the first and second sections of fibre are provided in physically separate first and second grating lengths of optical fibre, the grating lengths of fibre being physically long compared to the said sections (Figs. 2 and 3).

Ellerbrock et al. teaches the optical spectrum analyzer in which to optical detection means are provided, a first optical detection means being communicatively connected between one leg on the second side of the first coupler and the first grating length, and a second optical detection means being communicatively connected between the second leg on the second side of the first coupler and the second grating length (Fig. 3).

Ellerbrock et al. teaches the optical spectrum analyzer in which ach of the grating lengths of fibre is mounted on a separate means operable to apply a variable strain to a respective one of the first and second sections of fibre, the said means being operable to enable a variable strain to be applied to each of the first and second sections of fibre at either the same time or at different times (Col 7, lines 15-44).

Ellerbrock et al. teaches the optical spectrum analyzer in which the optical fibre signal routing means is an optical fibre circulator (Figs. 2 and 3).

Ellerbrock et al. teaches the optical spectrum analyzer in which the optical spectrum analyzer further comprises optical calibration apparatus for calibrating the peak wavelength of the or each grating in the tuneable optical filter (Col 9, lines 15-35).

Ellerbrock et al. teaches the optical spectrum analyzer in which the optical calibration apparatus comprises: an optical fibre coupler; a first section of fibre having a first reference Bragg grating inscribed therein, the said section of fibre being communicatively connectable to one leg on one side of the calibration coupler; and an optical source communicatively connected to one leg on the second side of the calibration coupler (Figs. 2 and 3).

Ellerbrock et al. teaches the optical spectrum analyzer in which the peak wavelength of the first reference grating falls within the wavelength tuning range of one of the gratings in the tuneable filter (Col 7, lines 5-44).

Ellerbrock et al. teaches the optical spectrum analyzer in which a further reference grating is provided in a further section of fibre for each further grating in the tuneable filter, the peak wavelength of each further reference grating falling within the wavelength tuning range of the corresponding grating (Figs. 4A-C and Col 7, lines 5-44).

Ellerbrock et al. teaches the optical spectrum analyzer in which the further section or sections of fibre are each communicatively connectable to the calibration coupler in place of the first section of fibre, each further reference grating thereby replacing the first reference grating (Figs. 2-4C).

Ellerbrock et al. teaches the optical spectrum analyzer in which the or each reference grating is athermalized, or the peak wavelength of the or each reference grating is known at a specified temperature, from independent calibration (Col 7, lines 4-54).

Ellerbrock et al. teaches the optical spectrum analyzer in which the optical source is a light emitting diode, the optical output spectrum of the light emitting diode including the peak wavelength of the or each reference grating (Col 5, lines 31-45).

Ellerbrock et al. teaches the optical spectrum analyzer in which the optical calibration apparatus is connectable to the optical spectrum analyzer between the input length of fibre and the tuneable optical filter, to thereby provide an alternative input signal to the optical spectrum analyzer, the second leg on one side of the calibration coupler being communicatively connectable to the input length of fibre and the second leg on the second side of the calibration coupler being communicatively connectable to the one leg on one side of the first coupler (Figs. 2 and 3).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 25, 28, 29, 31-33, 40, 57-63, 65, 67-69 and 82-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellerbrock et al.

Ellerbrock et al. discloses the optical spectrum analyzer as described above in paragraph 9 comprising a photodetector and another detector (334 or 336) and wherein the reflectivity of the or each reference grating varies as a function of wavelength across its spectral bandwidth, such that the intensity of an optical signal reflected by a reference grating is dependent on the wavelength of the optical signal (Fig. 6 and Col 9, lines 5-54)

and in which one or more of said optical fibre couplers is a 50:50 2x2 optical fibre coupler (Col 5, lines 46-53).

Ellerbrock et al. does not disclose that the other detector (334 or 336) is a photodetector.

With respect to claims 25, 28, 29, 31-33, 40, 57-63, 65, 67-69 and 82: Ellerbrock et al. discloses a photodetector and another detector. The use of the particular type of detector claimed by applicant, i.e., both detectors being photodetectors, absent any criticality, is considered to be nothing more than a choice of engineering skill, choice or design because 1) neither non-obvious nor unexpected results, i.e., results which are different in kind and not in degree from the results of the prior art, will be obtained as long as peak wavelength is detected, as already suggested by Ellerbrock et al., 2) the detectors claimed by Applicant and the detectors used by Ellerbrock et al. are well known alternate types of wavelength detectors which will perform the same function, if one is replaced with the other, of detecting the peak wavelength, and 3) the use of the particular type of detector by Applicant is considered to be nothing more than the use of one of numerous and well known alternate types of detectors that a person having ordinary skill in the art would have been able to provide using routine experimentation in order to detect the peak wavelength as already suggested by Ellerbrock et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical spectrum analyzer so that all of the detectors were photodetectors, in order to achieve the most accurate results.

With respect to claims 83 and 84: Ellerbrock et al. discloses an optical spectrum analyzer wherein the reflection from the ends us reduced. The use of the particular type

of reduction method claimed by applicant, i.e., the ends are terminated with an angled cleave or terminated in an index matching compound, absent any criticality, is considered to be nothing more than a choice of engineering skill, choice or design because 1) neither non-obvious nor unexpected results, i.e., results which are different in kind and not in degree from the results of the prior art, will be obtained as long as the reflection is reduced, as already suggested by Ellerbrock et al., 2) reduction means claimed by Applicant and the reduction means used by Ellerbrock et al. are well known alternate types of reflection reduction methods which will perform the same function, if one is replaced with the other, of reducing the reflection from the ends, and 3) the use of the particular type of reduction method by Applicant is considered to be nothing more than the use of one of numerous and well known alternate types of reduction methods that a person having ordinary skill in the art would have been able to provide using routine experimentation in order to reduce the reflection by the ends as already suggested by Ellerbrock et al.

12. Claims 26, 27, 30, 64, 66, and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellerbrock et al. in view of Mihailov et al. (U. S. patent No. 5,706,375).

Ellerbrock et al. discloses the optical spectrum analyzer as described above in paragraph 11.

Ellerbrock et al. does not disclose an optical spectrum analyzer in which the in-fibre optical filter is in the form of a chirped in-fibre Bragg grating.

Mihailov et al. discloses an optical spectrum analyzer in which the in-fibre optical filter is in the form of a chirped in-fibre Bragg grating (Col 3, lines 6-17 and Col 4, lines 13-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical spectrum analyzer of Ellerbrock et al. to have the Bragg gratings chirped Bragg gratings, as taught by Mihailov et al., as another form of a grating having a variable response (Mihailov et al. Col 4, lines 13-23).

With respect to claims 62 and 80: Ellerbrock et al. and Mihailov et al. disclose an optical spectrum analyzer comprising in-fibre gratings. The use of the particular type of in-fibre gratings claimed by applicant, i.e., moiré, absent any criticality, is considered to be nothing more than a choice of engineering skill, choice or design because 1) neither non-obvious nor unexpected results, i.e., results which are different in kind and not in degree from the results of the prior art, will be obtained as long as variable response of the grating is achieved as already suggested by Ellerbrock et al. and Mihailov et al., 2) the moiré grating claimed by Applicant and the Bragg or chirped Bragg grating used by Ellerbrock et al. and Mihailov et al. are well known alternate types of gratings which will perform the same function, if one is replaced with the other, of yielding variable peak wavelengths, and 3) the use of the particular type of grating by Applicant is considered to be nothing more than the use of one of numerous and well known alternate types of gratings that a person having ordinary skill in the art would have been able to provide using routine experimentation in order to have a variable peak wavelength as already suggested by Ellerbrock et al. and Mihailov et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the

gratings of Ellerbrock et al. and Mihailov et al. with moiré gratings since moiré gratings are also known to provide variable peak wavelengths.

13. Claims 70-79, and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ellerbrock et al. and Mihailov et al. as applied to claims 1, 2, 9, 13-17, 19, 21, 23-38, 40, 49-63, 65-69 and 82 above, and further in view of Koops et al. (U. S. Patent No. 5,982,962).

Ellerbrock et al. and Mihailov et al. disclose the optical spectrum analyzer as described above in paragraph 12 and wherein the peak wavelength is within the 1290 nm to 1310 nm wavelength range (Ellerbrock et al. Col7, lines 40-44).

Ellerbrock et al. and Mihailov et al. do not disclose an optical spectrum analyzer wherein the calibration apparatus comprises an in-fibre wavelength division multiplexing device (WDM) [in place of the coupler] and wherein the peak wavelength is within the 1540 nm to 1560 nm wavelength range.

Koops et al. discloses an optical spectrum analyzer wherein the calibration apparatus comprises an in-fibre wavelength division multiplexing device (WDM) (Col 2, lines 10-19) and wherein the peak wavelength is within the 1540 nm to 1560 nm wavelength range (Col 6, lines 46-49).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical spectrum analyzer of Ellerbrock et al. and Mihailov et al. to replace the coupler with a WDM, as taught by Koops et al., since these are both signal spitting devices used in optical analyzers.

14. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kersey et al. in view of Koops et al.

Kersey et al. discloses the optical spectrum analyzer as described above in paragraph 8.

Kersey et al. does not disclose an optical spectrum analyzer wherein the wavelength tuning range extends from approximately 1530 nm to approximately 1560 nm and wherein the wavelength tuning range extends from approximately 1580 nm to approximately 1620 nm.

Koops et al. discloses an optical spectrum analyzer wherein the wavelength tuning range extends from approximately 1530 nm to approximately 1560 nm (Col 6, lines 46-49).

Regarding wavelength tuning range: Kersey et al. and Koops et al. disclose a range of 1530 nm to 1560 nm but does not disclose a particular value for this parameter (i.e., a range of 1580 nm to 1620 nm). However, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide a wavelength tuning range of 1580 nm to 1620 nm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the "optimum range" involves only routine skill in the art. ***In re Aller***, 105 USPQ 233. Therefore, it would have been obvious to one of ordinary skill in the art to select a wavelength tuning range of 1580 nm to 1620 nm, since that is a range of wavelength used in optical spectrum analysis.

15. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morey et al.

Morey et al. discloses the optical spectrum analyzer as described above in paragraph 7.

Morey et al. does not disclose an optical spectrum analyzer in which the side-lobe suppression ratio of the or each grating is greater than –20dB.

Regarding the suppression ratio: Morey et al. discloses an optical spectrum analyzer where the grating is subject to strain and therefore has a suppression ratio. However, to choose a ratio of greater than –20dB, absent any criticality, is only considered to be the "optimum" value of the suppression ration, as stated above, that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. See ***In re Boesch***, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical spectrum analyzer of Morey et al to have a suppression ratio of –20dB in order to achieve optimal strain for the gratings.

16. Claims 46 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morey et al. in view of Alavie et al. (U. S. Patent No. 5,694,501).

Morey et al. discloses the optical spectrum analyzer as described above in paragraph 7.

Morey et al. does not disclose an optical spectrum analyzer in which means operable to apply a variable strain further comprises an elongate member, in the form of a metal beam, mounted on one end of the other mandrel and extending to a stop member provided on the mounting member, rotation of the one mandrel exerting a pulling force on the fibre mounted between the mandrels, thereby causing rotation of the other mandrel until the elongate member abuts the stop member, further rotation of the other mandrel

thereby being prevented, such that a further rotation of the one mandrel causes strain to be applied to the said fibre and the elongate member; and in which an electrical strain gauge is provided on the elongate member, the strain gauge being operable to measure the strain applied to the elongate member, to thereby enable the amount of strain applied to the section or sections of fibre including one or more gratings and hence the wavelength of the or each grating in the tuneable optical filter to be inferred.

Alavie et al. discloses an optical spectrum analyzer in which means operable to apply a variable strain further comprises an elongate member, in the form of a metal beam, mounted on one end of the other mandrel and extending to a stop member provided on the mounting member, rotation of the one mandrel exerting a pulling force on the fibre mounted between the mandrels, thereby causing rotation of the other mandrel until the elongate member abuts the stop member, further rotation of the other mandrel thereby being prevented, such that a further rotation of the one mandrel causes strain to be applied to the said fibre and the elongate member; and in which an electrical strain gauge is provided on the elongate member, the strain gauge being operable to measure the strain applied to the elongate member, to thereby enable the amount of strain applied to the section or sections of fibre including one or more gratings and hence the wavelength of the or each grating in the tuneable optical filter to be inferred (Col 3, line 26-Col 4, line 62 and Figs. 4 and 5a,b).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical spectrum analyzer of Morey et al., to include an elongate metal and a stop member on the mounting member, as taught by Alavie et al.,

in order to further control the strain placed on the gratings and to accurately measure the amount of strain on the gratings.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents disclose optical spectrum analyzers Rumer (U. S. Patent No. 6,484,462), Mizrahi et al. (U. S. Patent No. 6,466,346), Loh et al. (U. S. Patent No. 6,317,539), Glass et al. (U. S. Patent No. 5,812,711), and Melle et al. (U. S. Patent No. 5,319,435).

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amy R Cohen whose telephone number is (703) 305-4972. The examiner can normally be reached on 8 am - 5 pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (703) 308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3431.

ARC
June 16, 2003

Diego Gutierrez
Supervisory Examiner
Tech Center 2800